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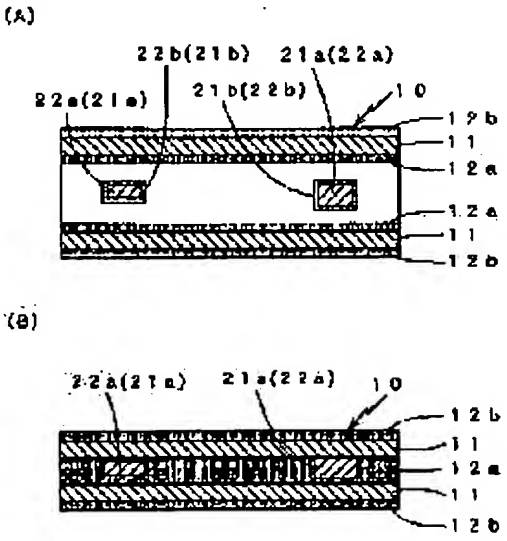
(54) THIN BATTERY

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a metallic positive electrode terminal and a negative electrode terminal from being brought into contact with the metal layers of an exterior body when they are extended to the outside from the seal section of the exterior body, to simply confirm the adhesion of the seal section of the exterior body, and to prevent the terminal made of a metal different from that of the metal layers of the exterior body from being kept in contact with the metal layers of the exterior body if both terminals are made of different metals.



SOLUTION: An electrode body 20 having a positive electrode 21 and a negative electrode 22 and an electrolyte are stored in an exterior body 10 provided with thermally fusible resin layers 12a on the inner face side of metal layers 11, and a metallic positive electrode terminal 21a and a negative electrode terminal 12a are extended to the outside from the positive electrode 21 and the negative electrode 22 through a seal portion where the resin layers 12a of the exterior body 10 are stuck together in this thin battery. The positive electrode terminal 21a and the negative electrode terminal 22a are made different in

* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] As for this invention, the resin layer of thermal melting arrival nature is prepared at least in one side of a metal layer. The electrode object and electrolyte which have a positive electrode and a negative electrode are made to hold in the sheathing inside of the body formed so that this resin layer might be located in an inside side. It is related with the thin cell which made the metal positive-electrode terminal which extended from the positive electrode and the negative electrode, and the negative-electrode terminal extend outside through the obturation part which both resin layers paste up in a sheathing object.
[0002]
[Description of the Prior Art] With the miniaturization of electronic equipment etc., as the power source, as shown in drawing 1 , in recent years The electrode object 20 and electrolyte which have a positive electrode and a negative electrode are made to hold in the interior of the sheathing object 10 which became flat. Metal positive-electrode terminal 21a and negative-electrode terminal 22a to which thickness became the same, respectively are made to extend from the positive electrode and negative electrode in this electrode object 20. Thus, the thin cell it was made to make positive-electrode terminal 21a and negative-electrode terminal 22a which extended extend outside through the obturation part of the sheathing object 10, respectively came to be used.
[0003] Moreover, in recent years, in such a thin cell, since sufficient cell capacity is obtained, nonaqueous electrolyte, such as nonaqueous electrolyte, is used for an electrolyte, and the thin nonaqueous electrolyte cell which was made to perform charge and discharge using oxidation of a lithium and a reduction reaction is developed.
[0004] And in the above thin cells, as shown in drawing 2 (A) and (B) As the sheathing object 10, what was formed saccate [flat] is used with the sheet which the resin layers 12a and 12b laminated to both sides of the metal layer 11. Metal positive-electrode terminal 21a and negative-electrode terminal 22a which extended from the positive electrode and negative electrode of the electrode object 20 held in this sheathing object 10 are made to extend outside through between resin layer 12a by the side of the inside in the periphery of the sheathing object 10, and 12a. In this condition He makes it paste up and was trying to make resin layer 12a by the side of the inside in the periphery of this sheathing object 10, and both 12a obturate.
[0005] When pasting up resin layer 12a by the side of the inside in the periphery of the sheathing object 10, and both 12a here as positive-electrode terminal 21a and negative-electrode terminal 22a are put in this way, and making it obturate, When the conditions on which resin layer 12a in the sheathing object 10 and both 12a are pasted up were weak, this thin cell could not be made to seal certainly, but external moisture permeated the interior of this thin cell, and there was a problem of electrolytes, such as the electrolytic solution made to

hold in this thin cell, spilling liquid.
[0006] Moreover, in inspecting whether resin layer 12a by the side of the inside of the sheathing object 10 and both 12a fully paste up as mentioned above, and the thin cell is sealed certainly, it sets to the former. The breakdown test which makes the part which resin layer 12a of the sheathing object 10 and both 12a have pasted up exfoliate was performed, the manufactured thin cell was not able to become useless and such inspection was able to be conducted about no manufactured thin cells.
[0007] On the other hand, in order to make a thin cell seal certainly, when the conditions on which resin layer 12a by the side of the inside of the sheathing object 10 and both 12a are paste up were strengthened, there was a problem of metal positive electrode terminal 21a and negative electrode terminal 22a which make it extend outside through an obturation part having contact the metal layer 11 of the sheathing object 10, and carry out internal short-circuit.
[0008] Moreover, although thickness of metal positive-electrode terminal 21a and negative-electrode terminal 22a which are made to extend from a positive electrode or a negative electrode as mentioned above was made the same, it might be said that only one side of positive-electrode terminal 21a and negative-electrode terminal 22a contacted the metal layer 11 of the sheathing object 10 depending on the conditions on which resin layer 12a by the side of the inside of the sheathing object 10 and both 12a are pasted up.
[0009] Here, in order to raise cell capacity as mentioned above, while the metal of an aluminum system was generally used for the above-mentioned positive-electrode terminal 21a in the case of the thin nonaqueous electrolyte cell which used nonaqueous electrolyte for the electrolyte, metals, such as copper and nickel, are used for negative-electrode terminal 22a, and the classes of metal used for positive-electrode terminal 21a and negative-electrode terminal 22a differed.
[0010] And when the metal layer 11 in the above-mentioned sheathing object 10 consists of positive-electrode terminal 21a and a metal of an aluminum system of the same kind, If a problem does not arise especially even if positive-electrode terminal 21a contacts the metal layer 11 of this sheathing object 10, but negative-electrode terminal 22a which consisted of metals, such as copper and nickel, performs charge and discharge where the metal layer 11 of this sheathing object 10 is contacted There was a problem that the metal of the aluminum system in the metal layer 11 of the sheathing object 10 alloyed with a lithium gradually, and became weak.
[0011] When the metal layer 11 of the above-mentioned sheathing object 10, on the other hand, consists of negative-electrode terminal 22a, copper of the same kind, nickel, etc., Even if negative-electrode terminal 22a contacted the metal layer 11 of this sheathing object 10, especially the problem was not produced, but where the metal layer 11 of this sheathing object 10 is contacted, when positive-electrode terminal 21a which consisted of metals of an aluminum system performed charge and discharge, there was a problem that the nonaqueous electrolyte in nonaqueous electrolyte decomposed.
[0012] However, in the former, inspection about whether only either of positive-electrode terminal 21a and negative-electrode terminal 22a touches the metal layer 11 of the sheathing object 10 as mentioned above was not conducted, but when such a thin cell was actually used, there was a problem that it was discovered as a defective.
[0013]
[Problem(s) to be Solved by the Invention] This invention makes it a technical problem to solve above various problems in the thin cell it was made to make it extend outside through the obturation part on which both the resin layers in which it was prepared at the inside side of a sheathing object paste up the metal positive-electrode terminal which extended from the positive electrode and the negative electrode, and a negative-electrode terminal.

[0014] Namely, when a metal positive-electrode terminal and a metal negative-electrode terminal are minded, both the resin layers by the side of the inside of a sheathing object are pasted up in this invention and it makes it obturate While enabling it to inspect simply whether both the resin layers by the side of the inside of a sheathing object fully paste up, and the thin cell is sealed certainly In the nonaqueous electrolyte cell by which the metals which the both sides of a positive-electrode terminal and a negative-electrode terminal prevent contacting and short-circuiting in the metal layer of a sheathing object, and constitute a positive-electrode terminal and a negative-electrode terminal further differed Let it be a technical problem to prevent that the terminal which consisted of metals of a different class from the metal layer of a sheathing object contacts the metal layer of a sheathing object, the metal layer of a sheathing object alloys or nonaqueous electrolyte decomposes.
[0015]
[Means for Solving the Problem] In the 1st thin cell in claim 1 of this invention In order to solve the above technical problems, the resin layer of thermal melting arrival nature is prepared at least in one side of a metal layer. The electrode object and electrolyte which have a positive electrode and a negative electrode are made to hold in the sheathing inside of the body formed so that this resin layer might be located in an inside side. In the thin cell it was made to make the metal positive-electrode terminal which extended from an above-mentioned positive electrode and an above-mentioned negative electrode, and a negative-electrode terminal extend outside through the obturation part which both the resin layers of the above-mentioned sheathing object paste up, respectively The thickness of the above-mentioned positive-electrode terminal and a negative-electrode terminal is changed, and it was made to contact the terminal of the thicker one in the metal layer of a sheathing object.
[0016] Until it changes the thickness of a metal positive-electrode terminal and a negative-electrode terminal and the terminal of the thicker one contacts the metal layer of a sheathing object like the 1st thin cell in this invention here If both the resin layers by the side of the inside of a sheathing object are pasted up, adhesion between this resin layer will fully be performed, a thin cell will come to be sealed certainly, and it will be prevented that external moisture permeates the interior of this thin cell, or the electrolytic solution in the interior of a thin cell leaks outside.
[0017] Moreover, it can check by measuring the conductivity between the terminal of the thicker one, and the metal layer of a sheathing object about whether the terminal of the thicker one as mentioned above touches the metal layer of a sheathing object, and both the resin layers by the side of the inside of a sheathing object fully paste up, and about whether the thin cell is sealed certainly, even if it does not destroy a thin cell, it can inspect easily.
[0018] Moreover, it sets on the 2nd thin cell in claim 2 of this invention. In order to solve the above technical problems, the resin layer of thermal melting arrival nature is prepared at least in one side of a metal layer. The electrode object and electrolyte which have a positive electrode and a negative electrode are made to hold in the sheathing inside of the body formed so that this resin layer might be located in an inside side. In the thin cell it was made to make the metal positive-electrode terminal which extended from an above-mentioned positive electrode and an above-mentioned negative electrode, and a negative-electrode terminal extend outside through the obturation part which both the resin layers of the above-mentioned sheathing object paste up, respectively While constituting an above-mentioned positive-electrode terminal and an above-mentioned negative-electrode terminal from a metal of a different class, the positive-electrode terminal or the negative-electrode terminal was constituted from a metal layer of a sheathing object, and a metal of the same kind, and thickness of the metal layer of a sheathing object and the terminal which consisted of metals of the same kind was made thicker than an other-end child.
[0019] And if thickness of the metal layer of a sheathing object and the terminal which

consisted of metals of the same kind is made thicker than an other-end child like this 2nd thin cell, where a positive-electrode terminal and a negative-electrode terminal are put between the resin layers by the side of the inside of a sheathing object as mentioned above When making it paste up and making both these resin layers obturate, the metal layer of a sheathing object and the terminal of the thicker one which consisted of metals of the same kind come to contact the metal layer of a sheathing object previously.

[0020] For this reason, when the classes of metal used for a positive-electrode terminal and a negative-electrode terminal differ like the aforementioned nonaqueous electrolyte cell, it is controlled that the terminal which consisted of metals of a different class from the metal layer of a sheathing object contacts the metal layer of a sheathing object, the metal layer of a sheathing object alloys, it becomes weak or it comes to be prevented that the nonaqueous electrolyte used for nonaqueous electrolyte decomposes.

[0021] moreover, since both the above resin layers in a sheathing object were pasted up strongly, when the terminal of the thinner one which consisted of metals of a different class from the metal layer of a sheathing object contacts the metal layer of a sheathing object When the metal layer of the sheathing object which became thick, and the terminal which consisted of metals of the same kind will contact the metal layer of a sheathing object and naturally inspects internal short-circuit of a thin cell rather than this, this comes to be discovered as a defective.

[0022] For this reason, the terminal which consisted of metals of a different class as mentioned above from the metal layer of a sheathing object can prevent now beforehand that the thin cell in contact with the metal layer of a sheathing object is actually used, the metal layer of a sheathing object alloys, and become weak or the nonaqueous electrolyte used as nonaqueous electrolyte decomposes.

[0023] If the above-mentioned metal layer and above-mentioned positive-electrode terminal of a sheathing object are constituted from a metal of an aluminum system and thickness of this positive-electrode terminal is made thicker than a negative-electrode terminal here as shown in claim 4 While it is controlled that the negative-electrode terminal which consisted of metals of a different class as mentioned above from the metal layer of a sheathing object contacts the metal layer of a sheathing object, and the metal layer of a sheathing object alloys The whole thin cell lightweight-izes, and weight energy density improves, and a sheathing object becomes soft, and the processing can also be easily performed now.

[0024] In order in changing the thickness of a positive-electrode terminal and a negative-electrode terminal as mentioned above only for the terminal of the thicker one to contact a sheathing object and to make it the terminal of the thinner one not contact a sheathing object, the thickness of the terminal of the thinner one is made to become 70% or less preferably 90% or less of thick Mino of the terminal of the thicker one here.

[0025]

[Embodiment of the Invention] While explaining concretely the thin cell concerning the operation gestalt of this invention hereafter based on an accompanying drawing, an example is given and the point which is excellent in the thin cell in this invention is clarified. In addition, the thin cell concerning this invention is not limited to what was shown in a following operation gestalt and a following example, in the range which does not change that summary, is changed suitably and can be carried out.

[0026] Also in the thin cell in this operation gestalt, as shown in aforementioned drawing 1 The electrode object 20 and electrolyte which have a positive electrode and a negative electrode are made to hold in the interior of the sheathing object 10 which became flat. He is trying to make metal positive-electrode terminal 21a and negative-electrode terminal 22a which extended from the positive electrode and negative electrode in this electrode object 20 extend outside through the obturation part of the sheathing object 10, respectively.

[0027] And he makes a separator 23 intervene between the positive electrode 21 which prepared the layer of positive active material in both sides of a positive-electrode charge collector (not shown), and the negative electrode 22 which prepared the layer of a negative-electrode active material in both sides of a negative-electrode charge collector (not shown), and is trying to use the thing around which these were made to wind as the above-mentioned electrode object 20, in the thin cell of this operation gestalt, as shown in drawing 3 . However, the gestalt of the electrode object 20 used in the thin cell of this invention is not restricted to the following, but what prepared the two or more layers thing which made the separator 23 intervene between a thing, and the positive electrode 21 and negative electrode 22 which the separator 23 was made to intervene between a positive electrode 21 and a negative electrode 22, and were turned up repeatedly can also be used for it.
[0028] Moreover, as shown in drawing 3 and drawing 4 , while changing the thickness of metal positive-electrode terminal 21a and negative-electrode terminal 22a which extended from the above-mentioned positive electrode 21 and above-mentioned negative electrode 22 in the electrode object 20 in the thin cell of this operation gestalt He is trying to cover a respectively suitable location with the resin layers 21b and 22b of thermal melting arrival nature in this positive-electrode terminal 21a and negative-electrode terminal 22a.
[0029] Although not limited here especially about the ingredient used for an above-mentioned positive electrode 21 and an above-mentioned negative electrode 22, in the case of a nonaqueous electrolyte cell As positive active material in a positive electrode 21, for example, manganese, cobalt, Use the lithium transition-metals multiple oxide containing nickel, iron, vanadium, at least one sort of niobium, etc., and as a negative-electrode active material in a negative electrode 22 For example, carbon materials other than a metal lithium or a lithium alloy, such as occlusion of a lithium ion, a graphite which can be emitted, corks, and an organic substance baking object, are used.
[0030] Moreover, in the case of a nonaqueous electrolyte cell, nonaqueous electrolyte and the solid electrolyte which were made to dissolve a solute in an organic solvent are used as an electrolyte.
[0031] here, independent [, for example / in solvents such as chain-like carbonates, such as annular carbonates, such as ethylene carbonate, propylene carbonate, vinylene carbonate, and butylene carbonate, and dimethyl carbonate, diethyl carbonate, a methylethyl car boat, a sulfolane and a tetrahydrofuran, 1, 3-dioxolane, 1, 2-diethoxy ethane, 1, 2-dimethoxyethane, and ethoxy methoxyethane,] as an organic solvent used for nonaqueous electrolyte -- or two or more sorts can be mixed and it can use.
[0032] On the other hand as a solute dissolved in the above-mentioned organic solvent For example, LiPF6, LiBF4, LiCF3 SO3, LiN (CF3 SO2)2, LiN (C2 F5 SO2)2, LiN (CF3 SO2) (C4 F9 SO2), LiC (CF3 SO2)3 and LiC (C2 F5 SO2)3 etc. -- a lithium compound can be used.
[0033] Moreover, inorganic solid electrolytes, such as a polymer electrolyte which made polymers, such as polyethylene oxide and a polyacrylonitrile, contain the above-mentioned solute as a solid electrolyte, a gel polymer electrolyte which infiltrated the above-mentioned nonaqueous electrolyte into the above-mentioned polymer, and LiI, Li3 N, can be used.
[0034] Moreover, while using what consisted of metals of an aluminum system as the above-mentioned positive-electrode terminal 21a in the case of a nonaqueous electrolyte cell, what consisted of metals, such as copper and nickel, as the above-mentioned negative-electrode terminal 22a is used.
[0035] On the other hand, while making the above-mentioned electrode object 20 hold as the above-mentioned sheathing object 10 in the sheathing object 10 which turned up and formed this sheet in both sides of the metal layer 11 using the sheet which the resin layers 12a and 12b laminated as shown in drawing 5 He is trying to make the above-mentioned positive-electrode terminal 21a and negative-electrode terminal 22a which extended from this electrode

object 20 extend outside from the sheathing object 10.
[0036] When this thin cell is the above nonaqueous electrolyte cells, here The metal layer 11 in this sheathing object 10 is constituted from terminal 21a with thicker thickness or 22a, and a metal of the same kind in the above-mentioned positive-electrode terminal 21a and negative-electrode terminal 22a. In being thick, while positive-electrode terminal 21a constitutes this metal layer 11 from a metal of an aluminum system, negative-electrode terminal 22a constitutes this metal layer 11 from metals, such as copper and nickel, in being thick.
[0037] And in this operation gestalt, it sets to three sides of the sheathing object 10 except the part which turned up the sheet which the resin layers 12a and 12b laminated to both sides of the metal layer 11 as mentioned above, both resin layer 12a by the side of the inside of the metal layer 11 is pasted up, and the sheathing object 10 is obturated.
[0038] In the part which makes positive-electrode terminal 21a and negative-electrode terminal 22a extend outside from the sheathing object 10 as mentioned above here Both resin layer 12a by the side of the inside of the metal layer 11 is pasted up together with [as shown in drawing 6 (A) and (B)] the above-mentioned resin layers 21b and 22b prepared in positive-electrode terminal 21a and negative-electrode terminal 22a. He is trying to contact terminal 21a or 22a with thicker thickness in the metal layer 11 of the sheathing object 10.
[0039] And if both resin layer 12a by the side of the inside of the metal layer 11 is pasted up and the sheathing object 10 is made to obturate until terminal 21a or 22a with thicker thickness in this way contacts the metal layer 11 of the sheathing object 10, it will be prevented that this thin cell is sealed certainly, external moisture permeates the interior of this thin cell, or the electrolytic solution in the interior of a thin cell leaks outside.
[0040] Moreover, about whether terminal 21a or 22a of the thicker one as mentioned above touches the metal layer 11 of the sheathing object 10, a part of resin layer 12b by the side of the external surface in the sheathing object 10 is made to exfoliate, and it can check easily by measuring the conductivity between terminal 21a of the thicker one or 22a, and the metal layer 11 of the sheathing object 10.
[0041] Moreover, when the thin cell of this operation gestalt is a nonaqueous electrolyte cell, since the metal layer 11 in the sheathing object 10 is constituted from terminal 21a with thicker thickness or 22a, and a metal of the same kind, as mentioned above, the metal layer 11 of the sheathing object 10 alloys, it becomes weak or it is prevented that the nonaqueous electrolyte used as nonaqueous electrolyte decomposes.
[0042] In addition, it sets on the thin cell in this operation gestalt. Although the sheet which the resin layers 12a and 12b laminated to both sides of the metal layer 11 is turned up, and it sets to three sides except this clinch part and was made to paste up resin layer 12a by the side of the inside of the metal layer 11, and both 12a in making the sheathing object 10 obturate Especially the approach of making it obturate the sheathing object 10 is not limited, but can use an approach better known than before.
[0043] Moreover, in the thin cell in this operation gestalt, although it was made to contact terminal 21a or 22a with thicker thickness in the metal layer 11 of the sheathing object 10 in making the sheathing object 10 obturate, it is not necessary to not necessarily contact terminal 21a or 22a with thicker thickness in the metal layer 11 of the sheathing object 10.
[0044] Next, in the thin cell in the above-mentioned operation gestalt, while constituting the metal layer 11 of the above-mentioned sheathing object 10 from aluminum in manufacturing 60mm and the thin cell by which the die length of a short side part was set to 35mm, the die length of a long side What carried out the laminating of the layer of the denaturation polypropylene whose thickness is 5 micrometers, and the layer of the polypropylene whose thickness is 50 micrometers to the inside side of this metal layer 11 as resin layer 12a was used.
[0045] On the other hand to positive-electrode terminal 21a in the above-mentioned electrode

object 20 While using the thing made from aluminum from which thickness was set to 100 micrometers, to negative-electrode terminal 22a The copper thing which made thickness change in 50-100 micrometers as shown in the following table 1 is used. The suitable location of this positive-electrode terminal 21a and each negative-electrode terminal 22a was covered with the resin layers 21b and 22b from which it consisted of denaturation polypropylene as mentioned above, respectively, and thickness was set to 50 micrometers.
[0046] And such positive-electrode terminal 21a and each negative-electrode terminal 22a are made to extend from a part for the short side part of the above-mentioned sheathing object 10, respectively. A part for this short side part is made to heat for 3 seconds at 235 degrees C using the hot platen whose width of face is 5mm. A part for the short side part of this sheathing object 10 was made to obturate, respectively, it did in this way, 100 thin cells were produced, respectively, positive-electrode terminal 21a and negative-electrode terminal 22a contacted the metal layer 11 of the sheathing object 10, it asked for the number of the cell which internal short-circuit generated, and that result was shown according to the following table 1.
[0047]
[Table 1]

正極端子の厚さ	負極端子の厚さ	内部ショートした電池数
100μm	50μm	0
100μm	60μm	0
100μm	70μm	0
100μm	80μm	11
100μm	90μm	63
100μm	100μm	92

[0048] If the thickness of positive-electrode terminal 21a and negative-electrode terminal 22a is changed so that clearly from this result Generating of a cell which the both sides of positive-electrode terminal 21a and negative-electrode terminal 22a contact the metal layer 11 of the sheathing object 10, and carries out internal short-circuit is controlled, and positive-electrode terminal 21a especially with thick thickness is received. When thickness of negative-electrode terminal 22a was made the 70% or less, the both sides of positive-electrode terminal 21a and negative-electrode terminal 22a contacting the metal layer 11 of the sheathing object 10, and carrying out internal short-circuit came to be prevented certainly.
[0049]
[Effect of the Invention] In the 1st thin cell [in / as explained in full detail above / this invention] In making it extend outside through the obturation part on which both the resin layers by the side of the inside of a sheathing object paste up the metal positive-electrode terminal and metal negative-electrode terminal which extended from the positive electrode and the negative electrode Until it changes the thickness of a positive-electrode terminal and a negative-electrode terminal and the terminal of the thicker one contacts the metal layer of a sheathing object Since it was made to paste up both the resin layers of a sheathing object, adhesion between resin layers of a sheathing object is fully performed. This thin cell comes to be sealed certainly and it came to be prevented that external moisture permeates the interior of this thin cell, or the electrolytic solution in the interior of a thin cell leaks outside.
[0050] Moreover, about whether the terminal of the thicker one as mentioned above touches the metal layer of a sheathing object, it could check by measuring the conductivity between the terminal of the thicker one, and the metal layer of a sheathing object, and both the resin layers

by the side of the inside of a sheathing object fully pasted up, and and the thin cell was sealed certainly, even if it was and did not destroy a thin cell, it could inspect easily.

[0051] Moreover, it sets on the 2nd thin cell in this invention. In making it extend outside through the obturation part on which both the resin layers of a sheathing object paste up the metal positive-electrode terminal which extended from the positive electrode and the negative electrode, and a negative-electrode terminal The thickness of the terminal which constituted the positive-electrode terminal or the negative-electrode terminal from a metal layer of a sheathing object and a metal of the same kind, and consisted of a metal layer of a sheathing object and a metal of the same kind is written more thickly than an other-end child. When making it paste up and making both these resin layers obturate where a positive-electrode terminal and a negative-electrode terminal are put between the resin layers in a sheathing object, the metal layer of a sheathing object and the terminal of the thicker one which consisted of metals of the same kind came to contact the metal layer of a sheathing object previously.

[0052] For this reason, when the classes of metal used for a positive-electrode terminal and a negative-electrode terminal like a nonaqueous electrolyte cell differed, it was controlled that the metal layer of a sheathing object and the terminal which consisted of metals of a different kind contact the metal layer of a sheathing object, the metal layer of a sheathing object alloyed, it became weak and it came to be prevented that the nonaqueous electrolyte used for nonaqueous electrolyte decomposes.

[0053] moreover, when the terminal of the thinner one which consisted of metals of a different class from the metal layer of a sheathing object in the 2nd thin cell in this invention contacts the metal layer of a sheathing object The metal layer of a sheathing object and the terminal of the thicker one which consisted of metals of the same kind also come to contact the metal layer of a sheathing object, and came to be discovered as a defective in inspection of internal short-circuit about such a thin cell.

[0054] Consequently, when it was prevented that only the terminal which consisted of metals of a different class from the metal layer of a sheathing object contacts the metal layer of a sheathing object and it actually used a thin cell like before, the metal layer of a sheathing object alloys and the trouble where became weak or the nonaqueous electrolyte used for nonaqueous electrolyte decomposed could be prevented beforehand.

[Translation done.]

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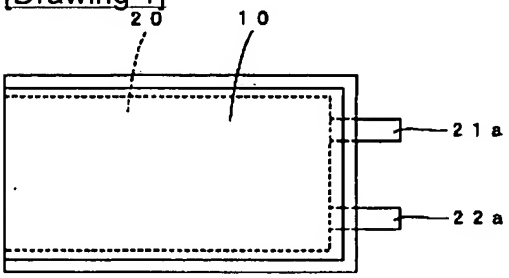
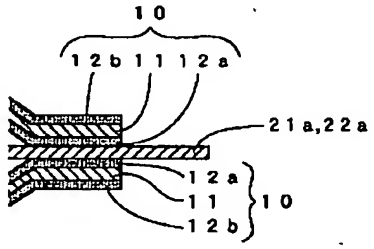
DRAWINGS

[Drawing 1]



[Drawing 2]

(A)



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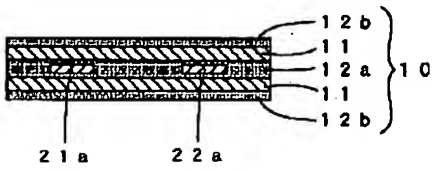
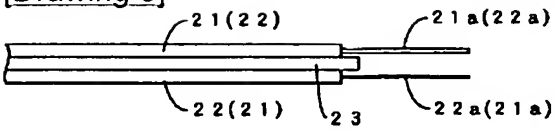
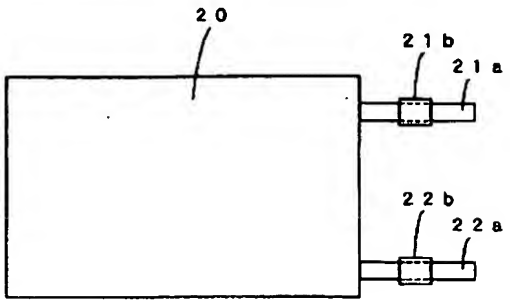


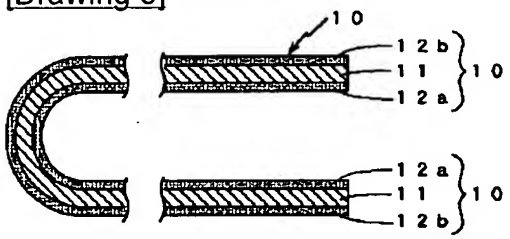
[Drawing 3]



[Drawing 4]

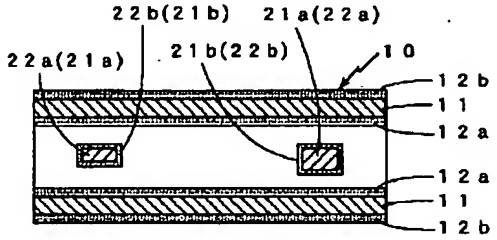


[Drawing 5]

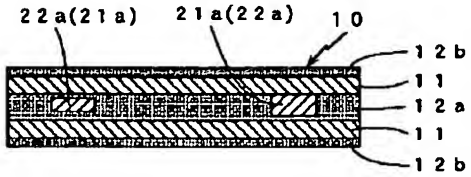


[Drawing 6]

(A)



(B)



[Translation done.]